

Introduction to Fish Issues in California, MES 101

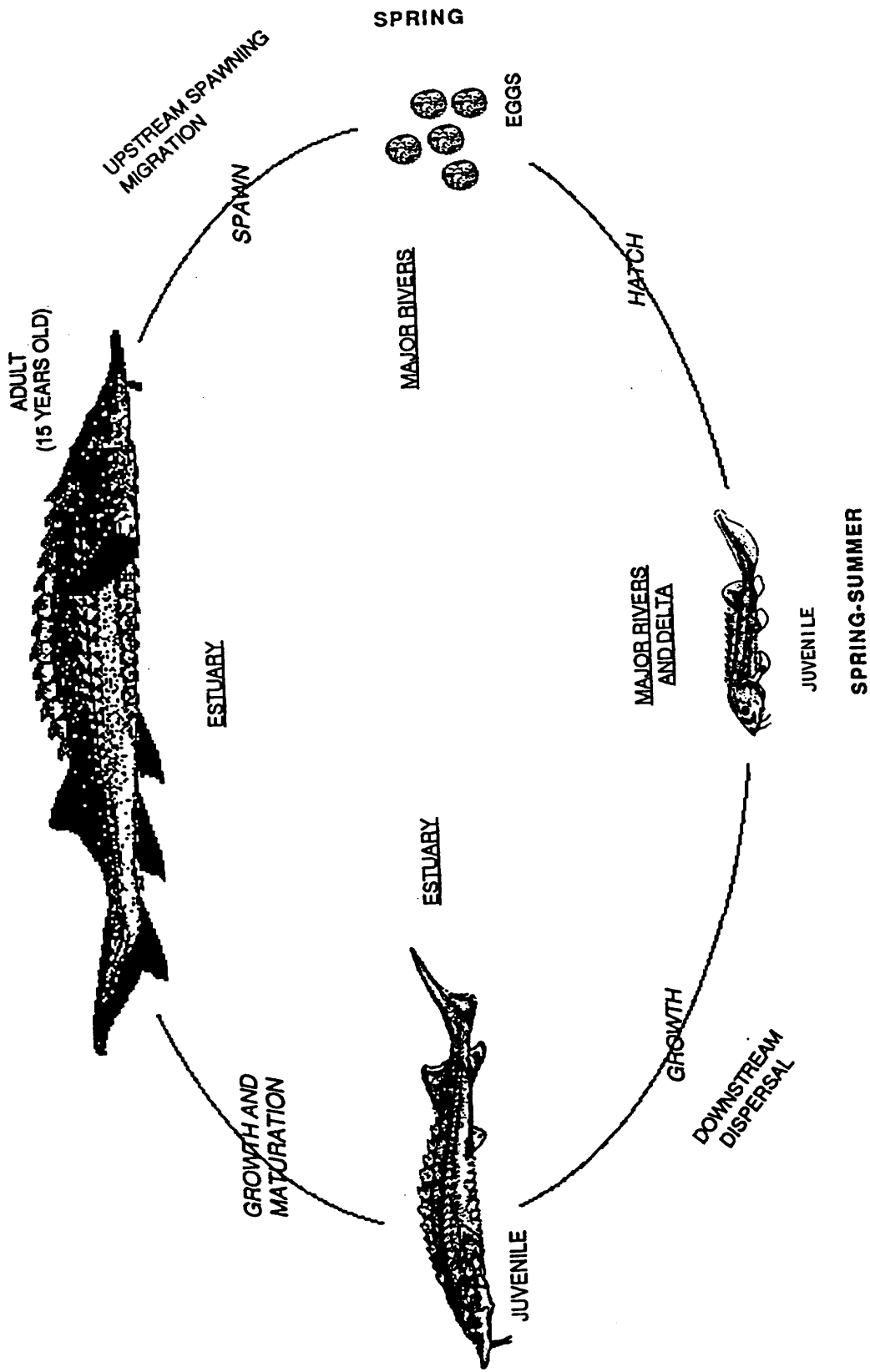
Native fishes of the Central Valley are the salmon, lamprey, steelhead and sturgeon, the squawfish (or pike minnow), the hardhead, tuleperch, splittail, blackfish and other cyprinids (minnows), there was also one centrarchid (bass), the sacramento perch. They evolved together in the system and were acclimated to the hydrolic conditions that existed before the dams. The habitat available before the dams was diverse and these fishes adapted to using different stretches or parts of it. For example, steelhead, winter run and spring run salmon entered the system during a time (winter and spring) when they could access the upper headwater reaches of the system. Fall run and late-fall run migrated into the system later (summer and fall) and so utilized the foothill reaches of the streams because of lower flows. Many of the minnows utilized much of the watershed, but generally were unable to get above the foothill regions of the watershed due to velocity and structural barriers.

It is important to remember that native fish evolved here together and were adapted to the environment and to the pressures that they would exert on each other in the ecosystem. Populations would rise and fall because of environmental conditions that would affect one species, which in turn would affect other species in a cyclic manner. This pattern of influence is very similar to the way fox and the rabbit populations affect each other. If there are a lot of rabbits, the foxes have an easy time getting food and do well in producing offspring, and the fox population grows. As the fox population grows the pressure they put on the rabbit population increases and so the rabbit population decreases. That, in turn, makes it harder for the foxes to fill their bellies. This affects the fox's reproduction and the fox populations decrease in accordance with the fluctuations of the rabbit population. Fish populations interact the same way biologically, with the physical environment influencing population success also.

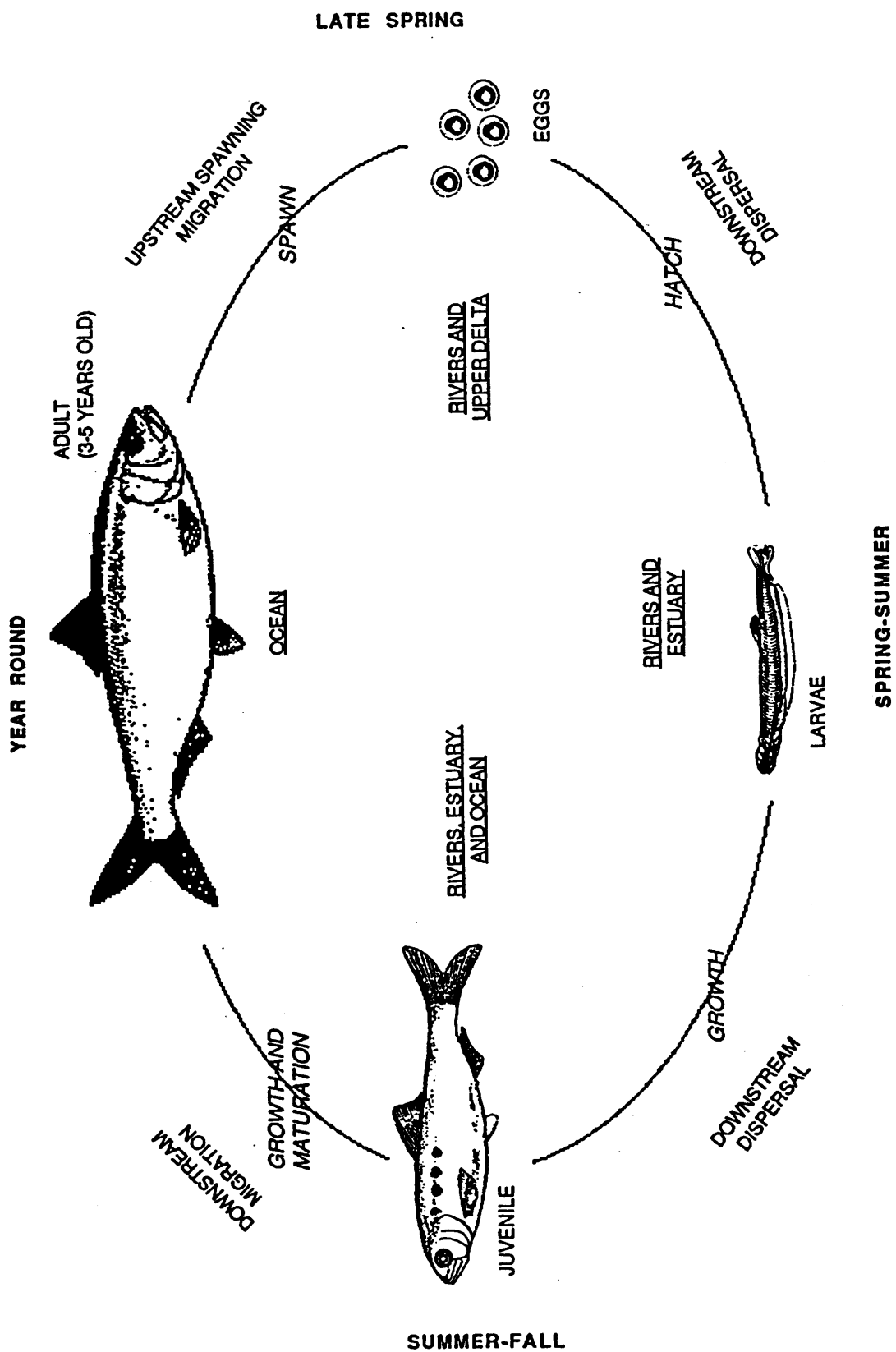
In the late 1800's introductions of fish not native to the West Coast or Central Valley began. Striped Bass, American Shad and every kind of catfish, bass and sunfish you can imagine were introduced into most bodies of water. These introductions were thought to be great as it would just increase the opportunity for the fishermen. What they didn't foresee was that the introduced fishes would slowly, and sometimes not so slowly, displace the native species. Introductions have a tendency to drive less tolerant species to extinction, and affect the symbiotic (long term biological) relationships that the native fish have been used to. For example, the black bass was introduced to the Central Valley system which had only one centrarchid. The basses of the mid-west have a greater range of temperature tolerances and so have been able to inhabit more areas than the Sacramento perch, but more importantly, the black basses are more aggressive foragers and have displaced the perch from its original environments. This in and of itself is bad for the perch, but the impacts of increased numbers of predatory fish increases the pressure on those other native fishes in a way that is above what they are adapted to handle. Going back to the fox and rabbit example, if you add a new predatory cat to the mix, what is the inevitable outcome for the rabbit population?

That brings us to the dams. Before the dams were built, specifically the bigger rim dams like Oroville, steelhead and spring run salmon would enter the river in the spring during high flows. They would ascend the river during this time up into the cooler headwaters where they could spawn any time they were ready. The spring run would summer in deep cool pools and then spawn in the late summer, early fall times. Steelhead would spawn in the winter and then the young would rear in the cool upper reaches for 1 to 3 years before migrating to the sea. Once we constructed the dam these fishes could not reach their required spawning and rearing habitats. Because of that their populations began to decline, and they began utilizing habitat that was marginal for their needs and already being used by other species. We have continued to build dams and have essentially eliminated 82% of the spring run salmon habitat and 95% of the steelhead habitat. These impacts have caused such serious declines in these two populations that they have become listed by the Endangered Species Act. This listing means that either the populations are threatened with extinction or in danger of being threatened with extinction. That designation requires that Federal entities do whatever is within their power to sustain and recover those species to a self-supporting population. *Self-supporting is defined as naturally reproducing, not hatchery type intervention.*

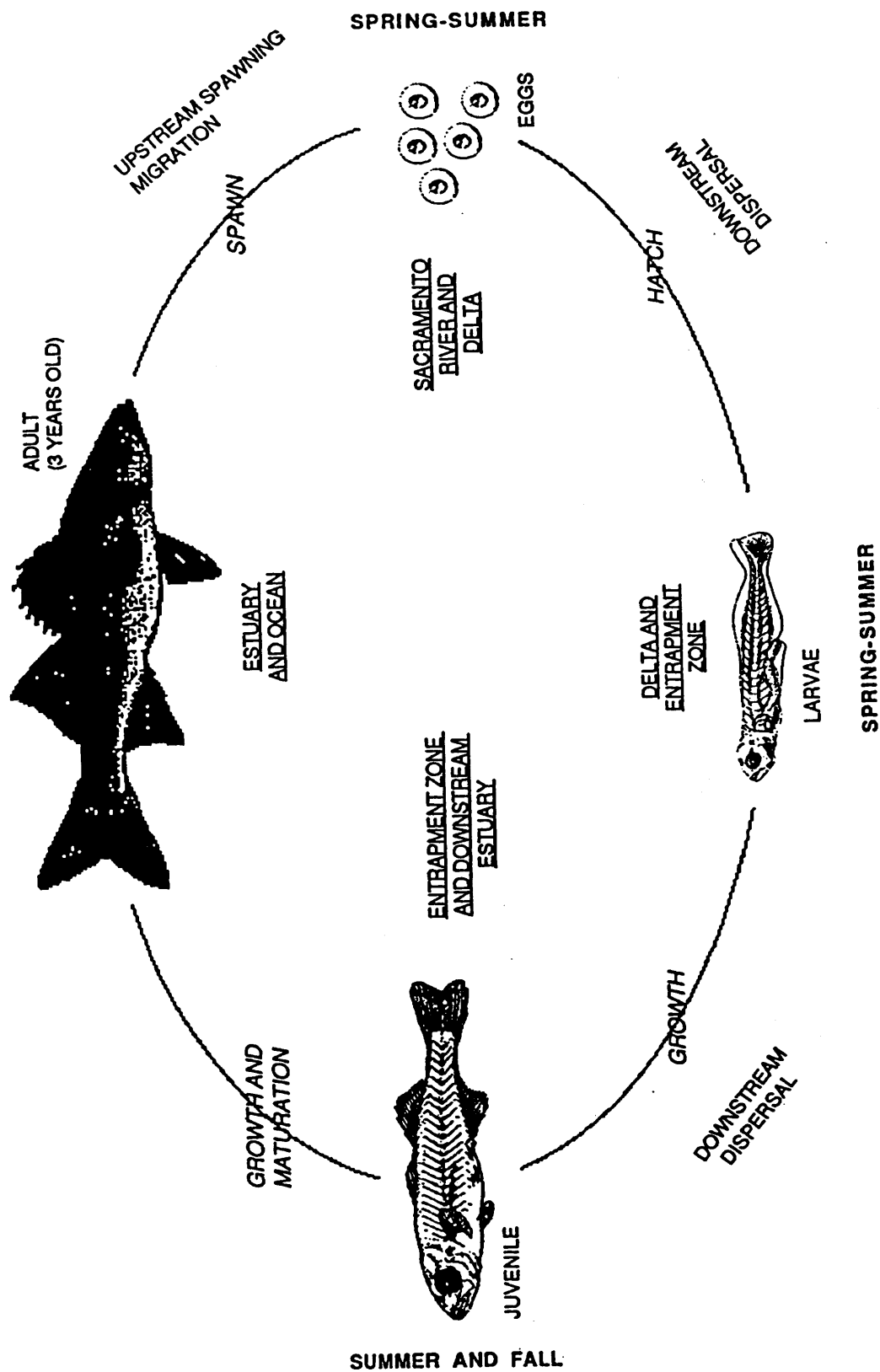
With that being the general state of the fish populations in the Central Valley (especially the salmon and steelhead), managing entities (Department of Fish & Game, National Marine Fisheries Service and Fish & Wildlife Service) have two real opportunities before them: 1) Return the fish to the habitat that allows them to be self supporting (i.e., the headwater reaches of the streams), 2) or provide pseudo habitat for them in the constrained (limited) environment that now exists below the dams (i.e., provide cold water below the dam in times when cold water would not naturally exist in that location). It doesn't take a rocket scientist to determine that we can't just get rid of the dams, not all of them anyway. Dams provide many necessary needs and functions that our civilization require, specifically flood control, storage and power. So, that leaves one short term alternative for managers, provide cold water downstream of the dams during unusual times of the year to mitigate the impacts the dam has caused to the steelhead and spring run life history. This puts a band aid on the the problem and allows populations to continue to exist while we tackle the larger problem of how to fix this over the long term.



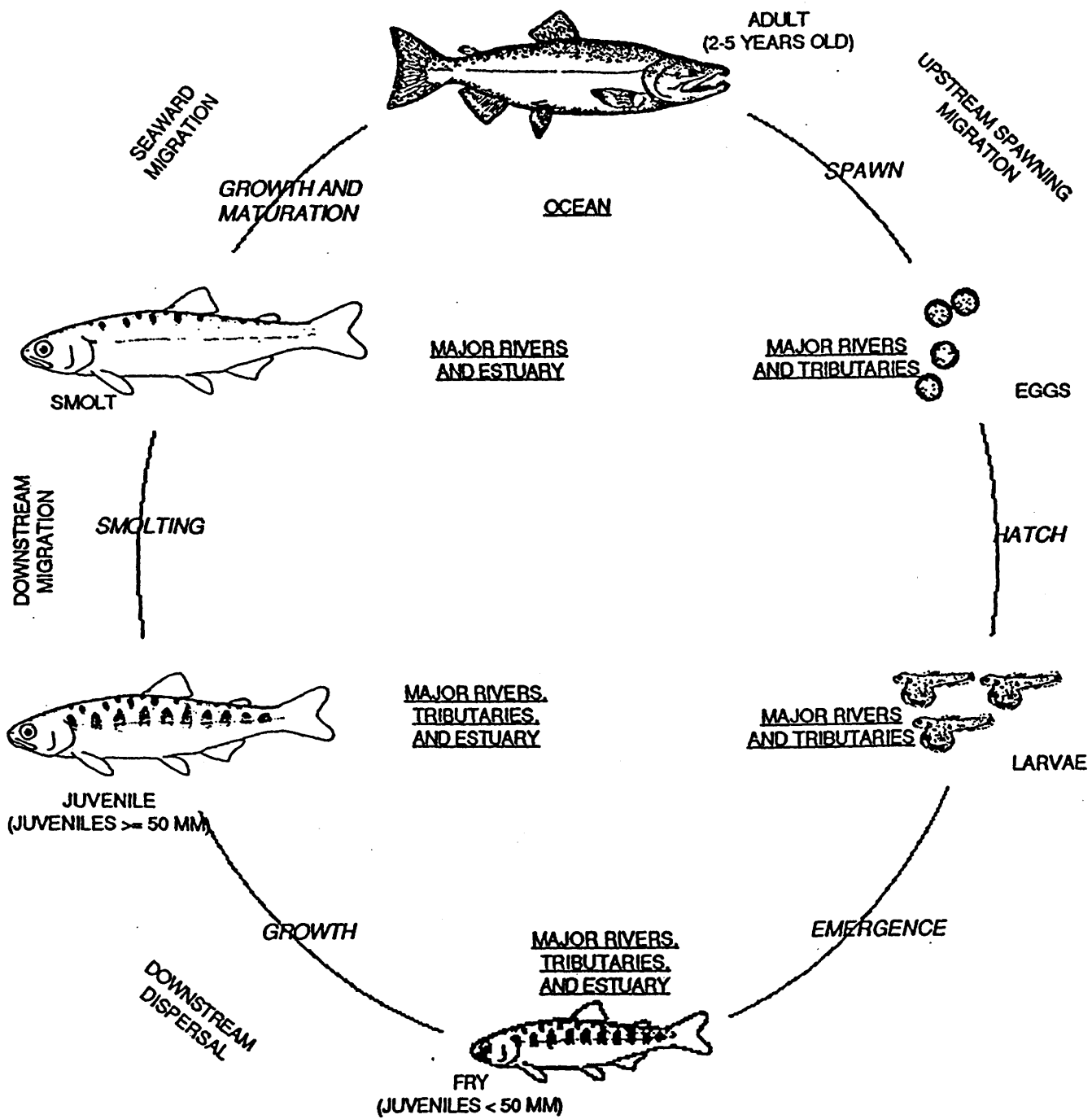
LIFE HISTORY OF WHITE STURGEON
FIGURE 2-VI-12



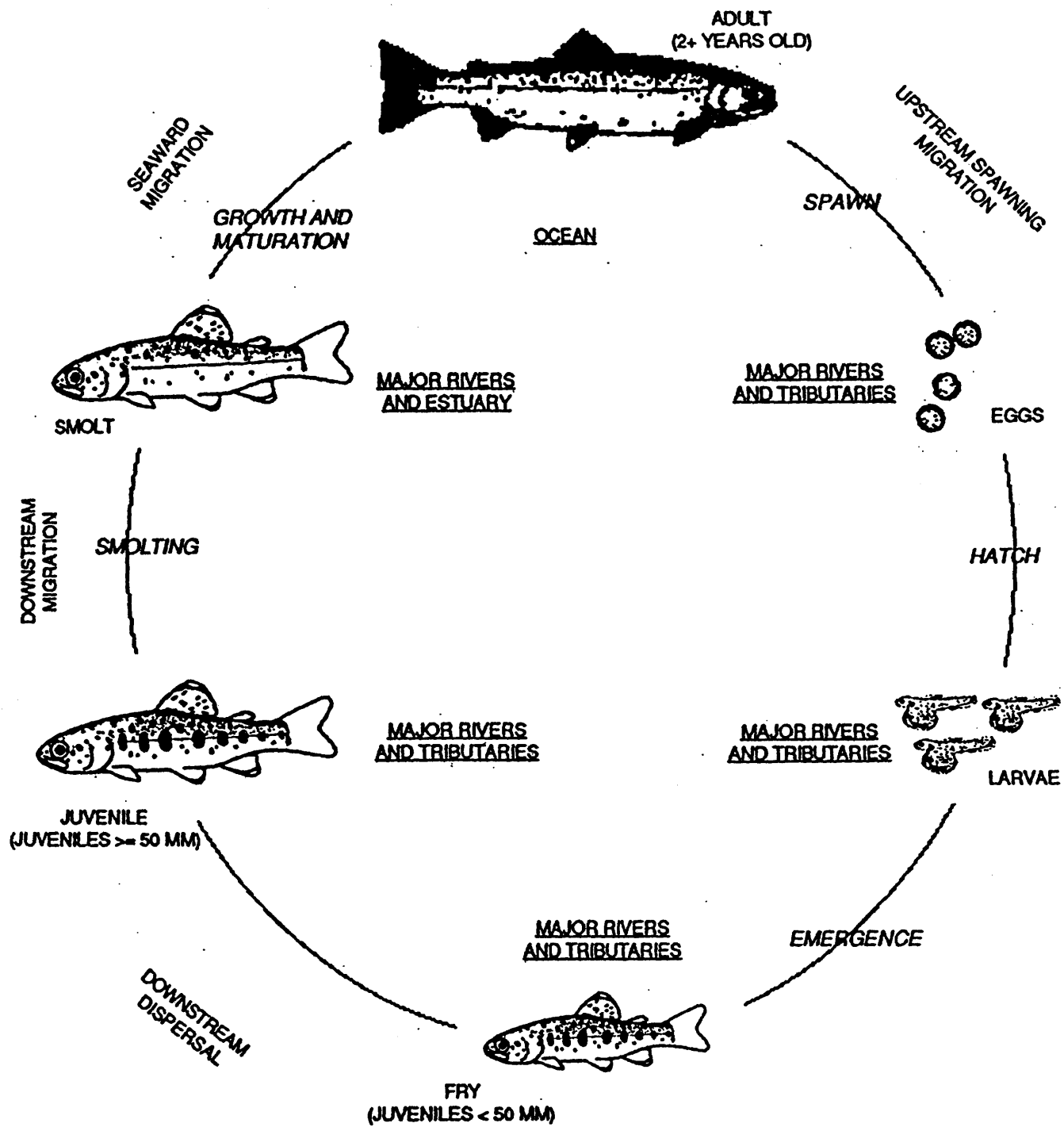
LIFE HISTORY OF AMERICAN SHAD
FIGURE 2-VI-11



LIFE HISTORY OF STRIPED BASS
FIGURE 2-VI-8



LIFE HISTORY OF CHINOOK SALMON
FIGURE 2-VI-1



LIFE HISTORY OF STEELHEAD TROUT
FIGURE 2-VI-7